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Liebert® GXT2-PP20KRT208™

User Manual—Parallel POD for Liebert GXT2-10000RT208



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IMPORTANT SAFETY INSTRUCTIONS



WARNING

Risk of electric shock. Can cause equipment damage, injury or death.

Extreme caution is required when performing maintenance.

Service and maintenance work must be performed only by properly trained and qualified personnel and in accordance with applicable regulations and manufacturers' specifications.

Be constantly aware that the UPS system contains high DC voltages as well as high AC voltages.

- Opening or removing the cover may expose personnel to lethal voltages within this unit even when it is apparently not operating and the input wiring is disconnected from the electrical source.
- Observe all warnings and cautions in this manual. Failure to do so may result in serious injury or death.
- Never work alone.

SAVE THESE INSTRUCTIONS

This manual contains important safety instructions pertaining to the Liebert GXT2-PP20KRT208, a parallel power output device that will connect up to three Liebert GXT2-10000RT208 UPSs. Read all safety, installation and operating instructions before operating the Liebert GXT2-PP20KRT208 parallel power output distribution (parallel POD). Adhere to all warnings on the unit and in this manual. Follow all operating and user instructions. Individuals must fully understand this equipment to install and operate it.

It is not intended for use with life support or other designated critical devices. Maximum load must not exceed that shown on the Liebert GXT2-PP20KRT208 rating label. This parallel POD is designed for use on a properly grounded (earthed), 100/200, 110/220, 115/230, 120/208, 120/240 or 127/220 VAC, 50Hz or 60Hz supply. Installation instructions and warning notices are found in this manual.

This Liebert parallel POD is only for use with a four-wire input: L1, L2, N, G.

This Liebert parallel POD must NOT be used with a three-wire, single-phase utility source: L1, N, G.

ELECTROMAGNETIC COMPATIBILITY—The Liebert GXT2-PP20KRT208 complies with the limits for a Class A digital device pursuant to Part 15 of FCC rules. Operation is subject to these conditions:

- This device may not be permitted to cause harmful interference.
- This device must accept any interference received, including interference that may cause undesired operation. Operating this device in a residential area is likely to cause harmful interference that users must correct at their own expense.

Operate the parallel POD only in an indoor environment in an ambient temperature range of 32°F to 104°F (0°C to 40°C). Install it in a clean environment, free from conductive contaminants, moisture, flammable liquids, gases and corrosive substances.

This parallel POD contains no user serviceable parts. Refer all faults to your local dealer, Liebert representative or the Emerson Network Power Liebert Worldwide Support Group.













Never block or insert any object into the ventilation holes or other openings of a UPS or this parallel POD.

Do NOT connect equipment that could overload the parallel POD or demand half-wave rectification from the parallel POD, for example: electric drills, vacuum cleaners, laser printers, hair dryers or any other appliance using half-wave rectification.

Storing magnetic media on top of the UPS or parallel POD may result in data loss or corruption.

Turn the parallel POD and connected UPSs Off and isolate the paralleling system before cleaning; use only a soft cloth, never liquid or aerosol cleaners.

GLOSSARY OF SYMBOLS

	Risk of electrical shock
	Indicates caution followed by important instructions
	AC input
	AC output
	Suggests the user consult the manual
	Indicates the presence of a valve-regulated lead acid battery
	Recycle
	DC voltage
	Equipment grounding conductor
	Bonded to ground
	AC voltage
	WEEE logo

1.0 INTRODUCTION

Congratulations on your choice of the Liebert GXT2-PP20KRT208 parallel POD. It allows parallel connection of input and output up to three Liebert GXT2-10000RT208 UPSs.

The Liebert GXT2-PP20KRT208 parallel POD features an N+1 redundancy. While one Liebert GXT2-10000RT208 UPS is available at 10kVA nominal power rating, connecting three UPSs in parallel provides 20kVA of output power, plus redundancy of one 10kVA UPS.

The Liebert GXT2-PP20KRT208 is a compact, parallel POD. A parallel POD continuously provides conditioned power from connected Liebert GXT2-10000RT208 UPSs whether utility power is present or not.

For ease and safety of installation, the Liebert GXT2-PP20KRT208 is designed with short-circuit protection and color-coded outlets for the UPS electrical connectors.

The Liebert GXT2-PP20KRT208 has three parallel ports to communicate with the UPSs.

2.0 SYSTEM DESCRIPTION

2.1 Compatibility

The Liebert GXT2-PP20KRT208 parallel POD is compatible only with the Liebert GXT2-10000RT208 UPS. No more than three Liebert GXT2-10000RT208 UPSs can be connected to the parallel POD.

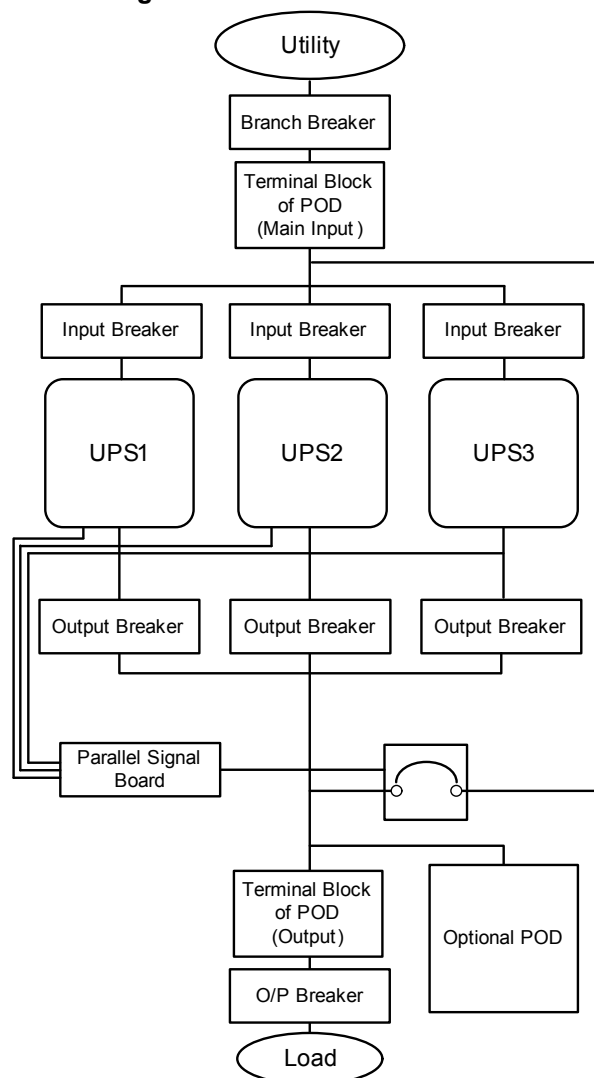
2.2 Redundancy Design

During normal operation with parallel connection of three Liebert GXT2-10000RT208 UPSs, the parallel POD supplies 20kVA of output power plus redundancy of one 10kVA UPS. With the Liebert GXT2-PP20KRT208 N+1 redundancy design, the failure of one UPS will not affect the functioning of the overall system.

2.3 Maintenance Bypass

When the UPS system must be completely shut down, maintenance bypass allows the parallel POD to work in the normal operation without interrupting power to the load. As shown in **Figure 1**, the Liebert GXT2-PP20KRT208 provides an alternate path for utility power to the connected load. In the event that the UPS experiences a failure, the UPS battery runs out or any other condition occurs requiring maintenance on the UPS, the user may manually transfer the connected load from the inverter to bypass by switching the maintenance bypass breaker to the On position.

Figure 1 Paralleling system block diagram

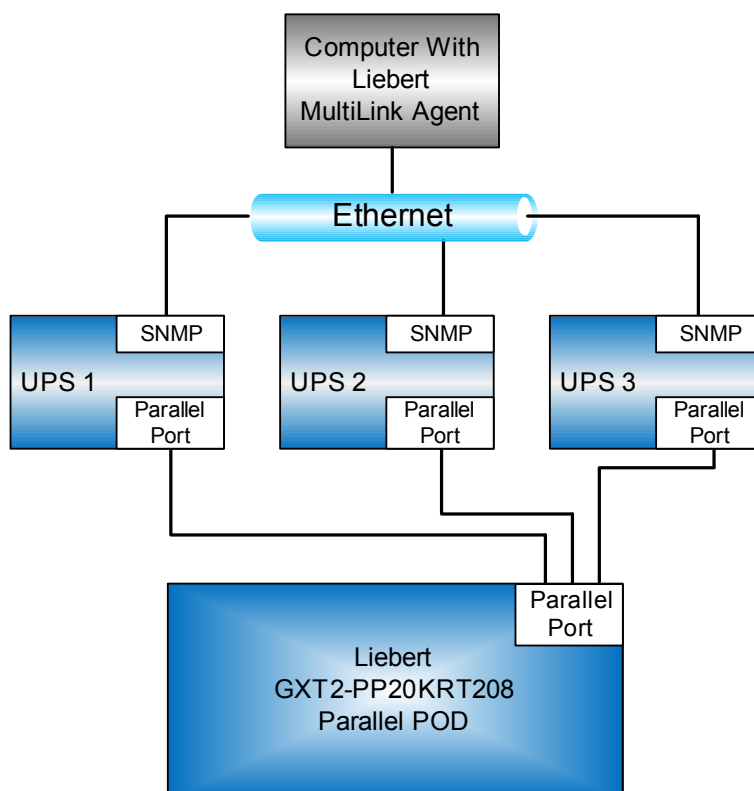


2.4 Liebert MultiLink™ Shutdown

The parallel POD supports the orderly shutdown of computer operating system through its compatibility with Liebert MultiLink 1.5 software. When properly configured to operate with Liebert MultiLink 1.5, the parallel POD will operate as a complete system; On Battery and Low Battery events will not be sent from the UPS when it is operating in redundant mode and the remaining UPS is able to support the total load.

For the paralleling system to work properly with Liebert MultiLink 1.5, each connected 10kVA UPS must have an SNMP card properly installed and configured in the Liebert IntelliSlot® bay. Liebert MultiLink 1.5 will not work properly with the parallel system through the serial port connection.

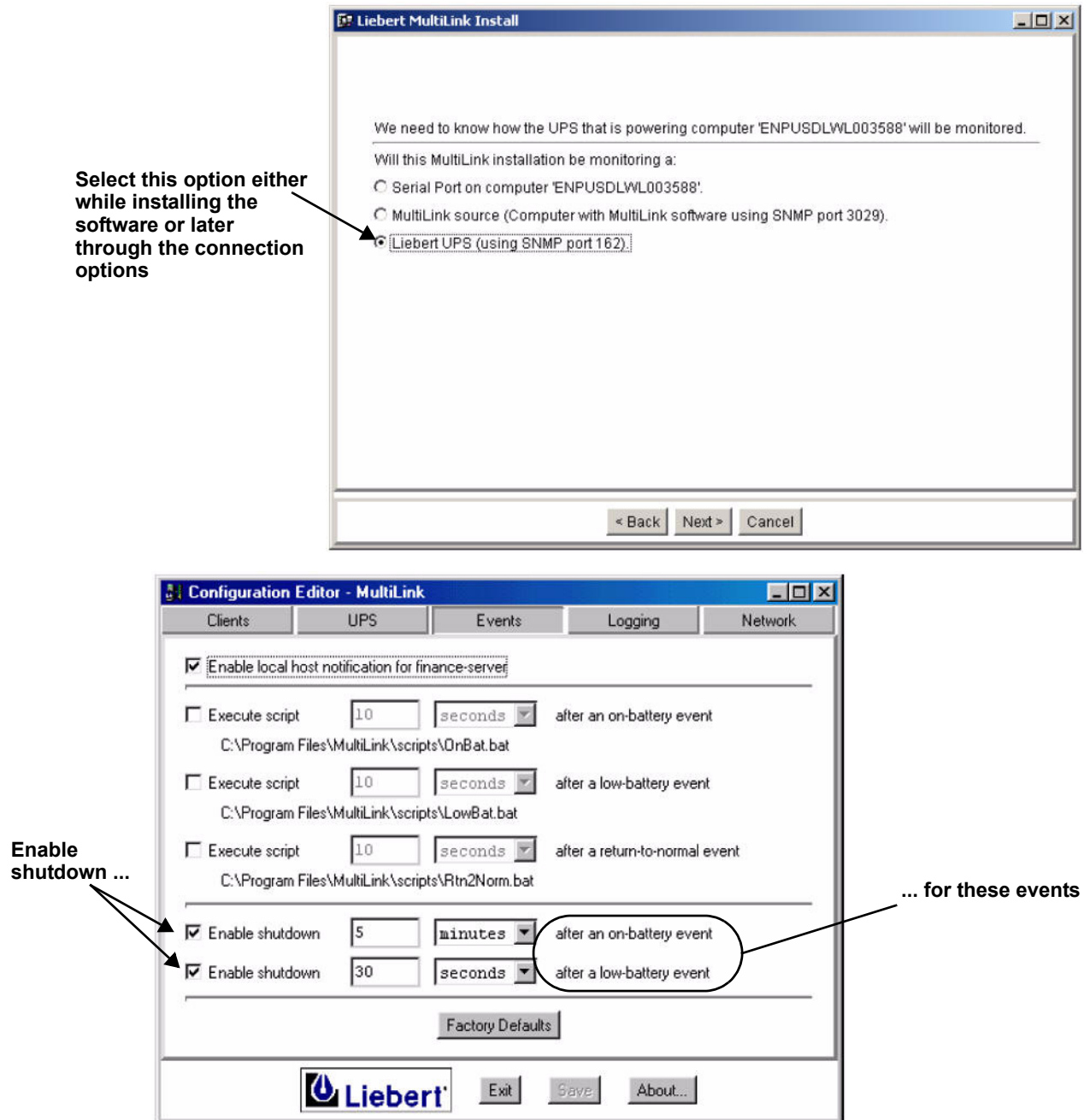
Figure 2 Liebert MultiLink connection diagram for parallel POD



The SNMP card must be properly configured with an IP ADDRESS, NETMASK and GATEWAY. Refer to the SNMP card user manual for detailed instructions. The SNMP card must also be configured with a community string to be monitored by Liebert MultiLink. For details, refer to the Liebert MultiLink 1.5 user manual, SL-53620, available at the Liebert Web site, www.liebert.com

Liebert MultiLink 1.5 also must be properly configured for the software shutdown to work properly with the parallel system. Refer to the Liebert MultiLink 1.5 user manual for detailed configuration instructions. Two important settings required for Liebert MultiLink shutdown to work properly are:

- The connection option “Liebert UPS (using SNMP port 162)” must be selected, either during installation or later (see **Figure 3**; refer to the MultiLink 1.5 user manual, SL-53620, for details).
- The options “Enable shutdown after an on-battery event” and “Enable shutdown after a low-battery event” must be selected for Liebert MultiLink to initiate shutdown when either of these events occur (see **Figure 3**; refer to the MultiLink 1.5 user manual, SL-53620, for details).

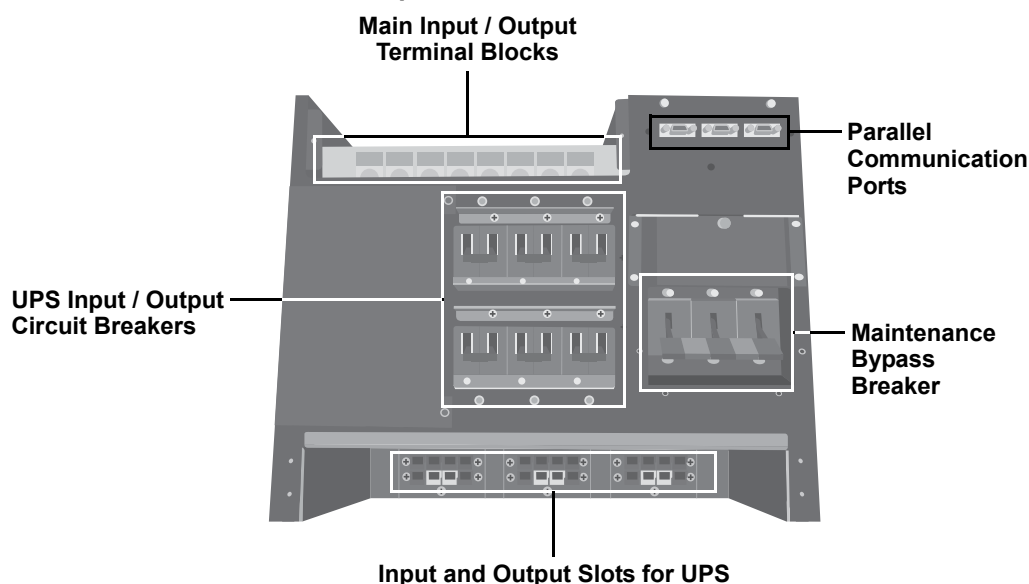
Figure 3 Configure Liebert MultiLink 1.5 for shutdown to work with a parallel system

3.0 MAJOR COMPONENTS

The Liebert GXT2-PP20KRT208 has five main components (see **Figure 4**):

- UPS input / output circuit breakers
- Main input / output terminal blocks
- Parallel communication ports
- Maintenance bypass breaker
- Input and output slots for each UPS

Figure 4 Liebert GXT2-PP20KRT208 components



3.1 Input and Output Slots for UPS

The parallel POD is shipped with three input/output slots for hardwire connections with the UPSs. The eight-pole connector with color coding and keying are used for the interconnecting wires between UPS input and output. The UPS connector will snap into the connector of the parallel POD only in the correct direction and only with the same color.

3.2 Main Input / Output Terminal Blocks

Hardwire terminal blocks are at the top left corner on the front side of the parallel POD. Input and output wiring should not share the same conduit. See the requirements and label in **5.3 - Main Input and Output Terminal Block Connections** to connect the wires.

3.3 Maintenance Bypass Breaker

The Maintenance Bypass Breaker allows the user to transfer the load to utility to remove a UPS from the paralleling system for maintenance without shutting off power to the load (see **8.1.2 - Bypass Mode**) for the transfer procedure). For further information on the UPS Maintenance Bypass Breaker, refer to the Liebert GXT2-10000RT208 user manual, SL-23444, available at the Liebert Web site, www.liebert.com

3.4 UPS Input / Output Circuit Breakers

The Liebert GXT2-PP20KRT208 is equipped with six circuit breakers (three input breakers and three output breakers). During normal operation in the paralleling system, input/output circuit breakers are in the On position. When installing or removing a UPS, the corresponding breakers should be switched to the Off position.

3.5 Parallel Communication Port

The Liebert GXT2-PP20KRT208 parallel POD has three 15-pin parallel communication ports on the upper right of the parallel POD. Several signals are provided on this port to communicate with each UPS. Use the parallel communication cables for the connection between the parallel POD and each UPS. When the UPS is powered on, it enters parallel mode automatically. Refer to **5.0 - Installation** for the cable connection procedures

NOTICE

Do not disconnect the parallel communication cable while the parallel system is operating and powering the connected load. This may cause load-drop and damage the UPS or connected equipment.

If the parallel communication cable is disconnected or the connection is dropped during parallel operation, the UPS will shut down immediately.

If the parallel communication cable is not connected to the UPS, the UPS will not enter parallel mode, even if the parallel power cable is connected. Operating without the parallel communication cable may result in damage to the UPS.

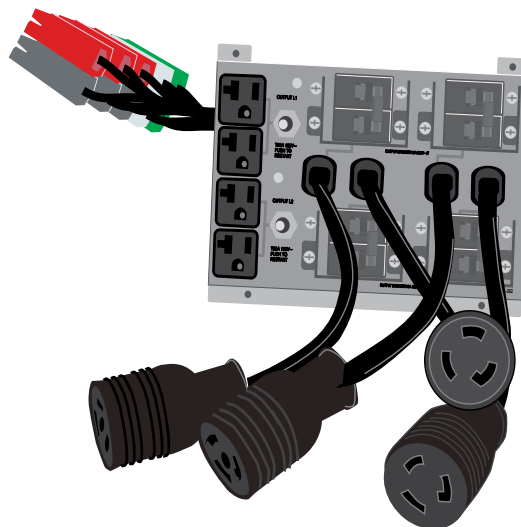
3.6 Optional Power Distribution

Additional power distribution options are available to provide the benefit of output receptacle convenience. See **5.4 - Add an Output Power Distribution Module—Optional** for installation steps.

Figure 5 Optional output distribution modules



PD-201
Power Distribution Option
(with internal connector shown)



PD-202
Power Distribution Option



NOTE

The Liebert GXT2-PP20KRT208 distribution POD options are different than the distribution PODs used with individual Liebert GXT2-10000RT208 UPSs. Each POD type has different connectors and are not interchangeable.

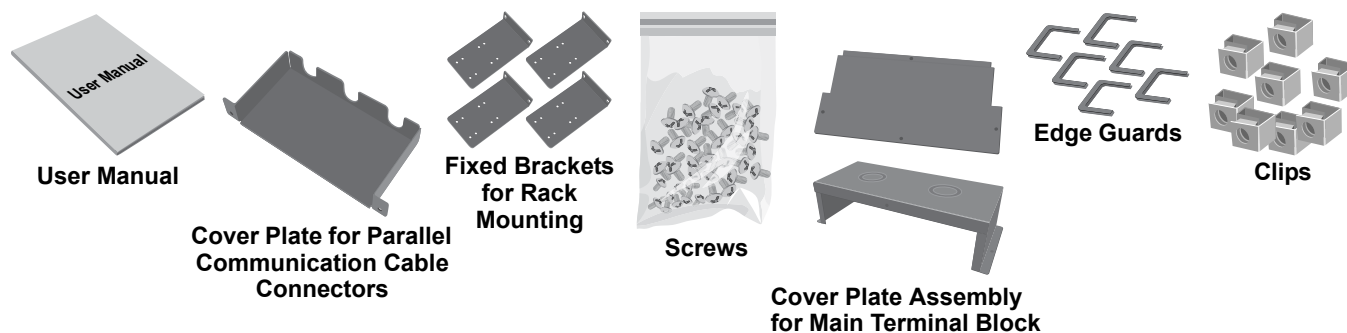
If a Liebert GXT2-10000RT208 UPS that is to be connected to the parallel POD has a distribution POD option, then the distribution POD must be removed from the UPS to connect the parallel power cable assembly to the UPS.

4.0 WHAT'S INCLUDED

The Liebert GXT2-PP20KRT208 is shipped with:

- User Manual: 1
- Cover Plate for Main Terminal Block: 1
- Cover Plate for Parallel Communication Cable Connectors: 1
- Edge Guards: 6
- M6 Clips: 8
- Fixed Rack-Mounting Brackets: 4
- Screw Kit: M3x6 Screws, 9; M4x8 Screws, 32; M6x16 Screws, 8

Figure 6 Items shipped with Liebert GXT2-PP20KRT208



For the paralleling system connection, a Liebert GXT2-20KPC-6 kit must be purchased separately for each UPS. One kit contains:

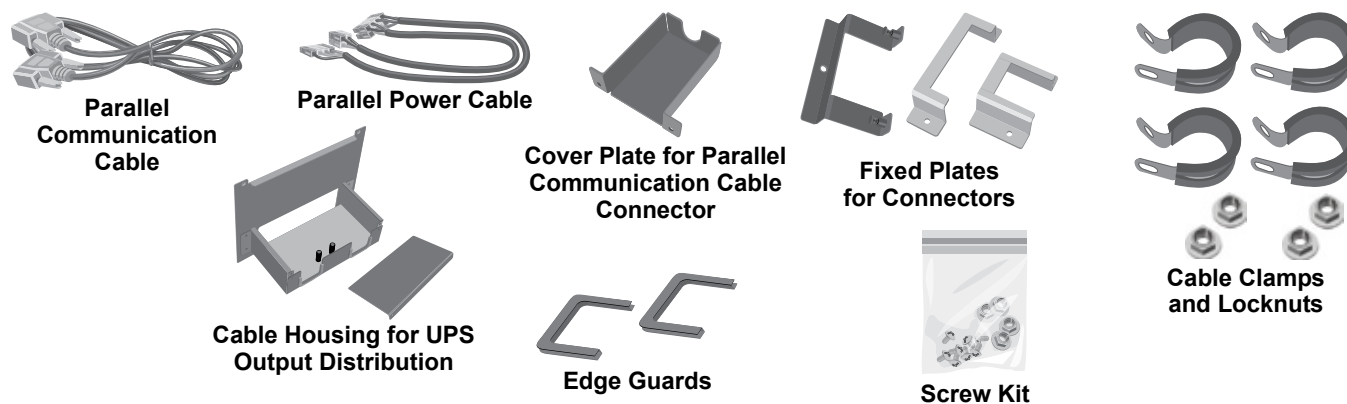
- Parallel Power Cable: 1
- Parallel Communication Cable: 1
- Cover Plate for Parallel Communication Cable Connector: 1
- Cable Housing for UPS Output Distribution: 2
- Fixed Plate for Connector: 3
- Edge Guards: 2
- Cable Clamps and Locknuts: 4 Each
- Screw Kit: M6 Hex Nuts, 4; M3x6 Screws, 8



NOTE

Make sure that you have enough Liebert GXT2-20KPC-6 kits to install the paralleling system.

Figure 7 Liebert GXT2-20KPC-6 components



4.1 What You Need

You will need the following tools for assembly of the parallel system connections.

- 3/8" slotted screwdriver
- Phillip #1 screwdriver
- Phillip #2 screwdriver
- 10mm hex driver
- 5mm hex driver
- 3/16" hex wrench
- Star T10 screwdriver

5.0 INSTALLATION

This section includes instructions on how to set up the connections between the parallel POD and the UPS, connect wiring to the terminal block, install the Liebert GXT2-PP20KRT208 parallel POD in a rack or on a wall and add an optional distribution POD.

Do NOT attempt to start the UPS, turn on any circuit breaker or energize the input power until instructed to do so in **6.0 - Initial Startup and Electrical Checks**. Verify that all circuit breakers are in the open (Off) position.

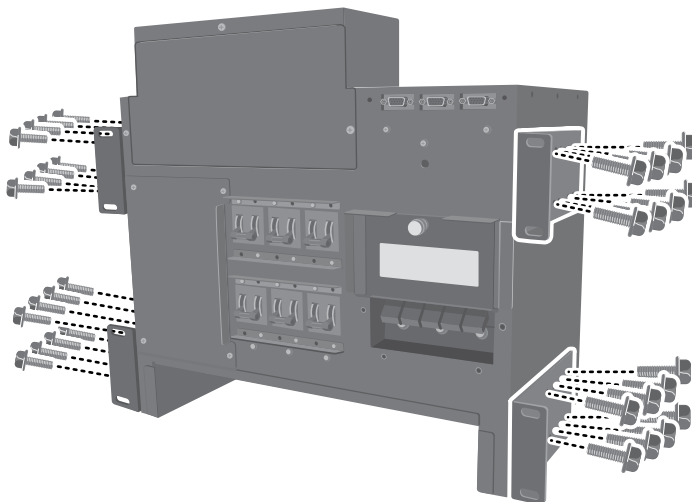
Inspect the parallel POD for freight damage. Report damage to the carrier and your local dealer or Liebert representative.

5.1 Mount the Liebert GXT2-PP20KRT208 in a Rack or on a Wall

The Liebert GXT2-PP20KRT208 may be mounted either in a rack or on a wall. When installing the Liebert GXT2-PP20KRT208, use the factory-supplied fixed brackets.

Position the four fixed brackets at the screw holes—front, middle or rearmost—on either side of the Liebert GXT2-PP20KRT208 that best fits the installation location desired and attach with included screws. **Figure 8** shows an example of securing the fixed brackets to the front screw holes.

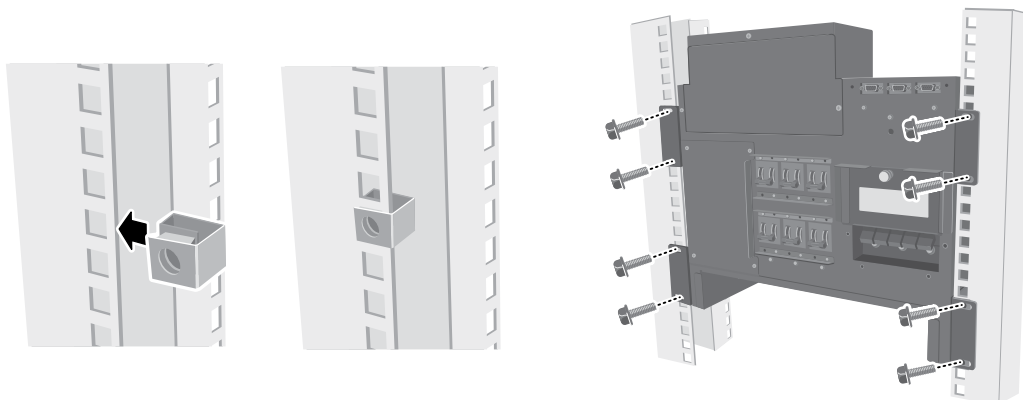
Figure 8 Secure the fixed brackets to the Liebert GXT2-PP20KRT208



5.1.1 Mount the Liebert GXT2-PP20KRT208 in a Rack

Determine an appropriate place for the Liebert GXT2-PP20KRT208 in the rack and secure the fixed brackets to the rack with eight M6x16 screws (factory-supplied).

Figure 9 Secure a parallel POD to a rack

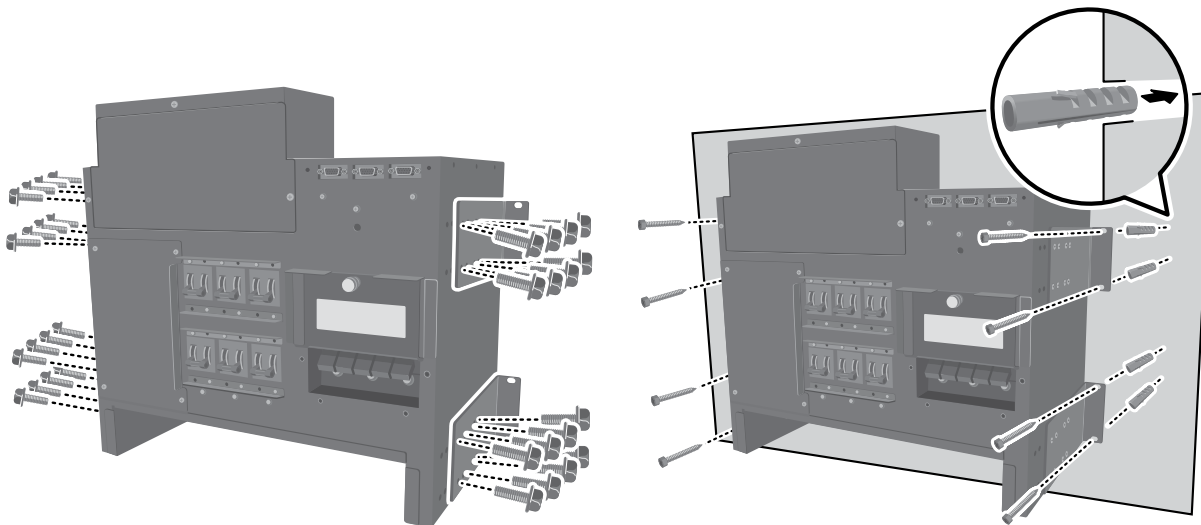


5.1.2 Mount the Liebert GXT2-PP20KRT208 on a Wall

Mounting the parallel POD on a wall requires eight field-supplied wall inserts and eight field-supplied screws. The minimum size for the wall insert is 5x30 and for the screw, M5x30.

1. Secure the four fixed brackets to the rearmost screw holes on either side of the Liebert GXT2-PP20KRT208 (see **Figure 10**).
2. Use the electric drill to drill the holes with suitable depth (could be the length of the wall inserts) in the wall.
3. Put the field-supplied wall inserts into the holes.
4. Hold the parallel POD against the wall, aligned with the mounting holes and use field-supplied screws to attach the unit to the wall (see **Figure 10**).

Figure 10 Mount the Liebert GXT2-PP20KRT208 on a wall



5.2 Paralleling System Connections

The Liebert GXT2-PP20KRT208 is shipped with the input and output slots for UPS and the optional output power distribution section covered. Installation of the paralleling system requires: parallel power cables, fixed plates and cable clamps. These are included in Liebert GXT2-20KPC-6 kit (see **Figure 7**). Follow the procedure below to start the installation.



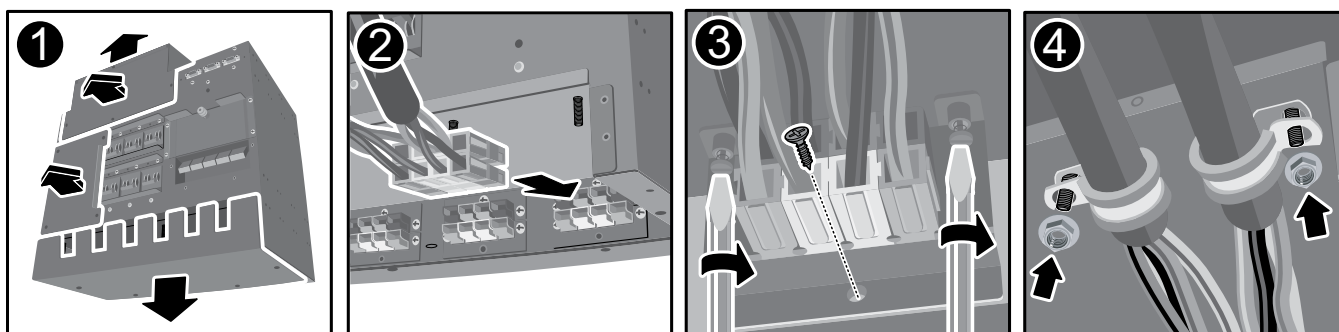
WARNING

Risk of electric shock. May cause property damage, personal injury or death.

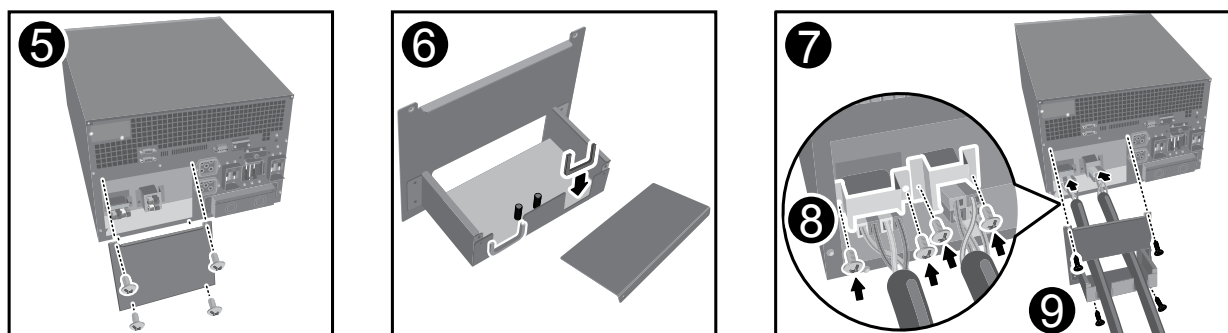
Lethal voltages may exist within the UPS and parallel POD as long as the UPS is connected. Ensure that all the UPS are disconnected and that the power is off before working within the parallel POD. Check the circuits with a voltmeter.

In addition, make sure all the internal batteries within the Liebert GXT2-10000RT-208 UPSs are disconnected.

1. Remove the screws securing the parallel POD covers. Keep the optional output power distribution cover closed when not in use (see **5.4 - Add an Output Power Distribution Module—Optional** for the optional distribution POD installation).
2. Connect one end (eight-pole connector) of the parallel power cable to the UPS input and output slot on the parallel POD. They are color-coded for proper alignment and installation.
3. Use the fixed plate to tighten the connector securely.
4. Use two cable clamps to fasten the parallel power cable onto the parallel POD (10mm hex driver is required).



5. Remove the output distribution cover from the rear panel of the UPS. If either power distribution module PD-101, PD-102 or PD-1xx is installed on rear panel of the UPS, it must be removed.
6. Insert the edge guards (see **Figure 6**) into the open slots on the cable housing.
7. Pass the other end of the parallel power cable through the cable housing for output distribution of UPS and connect the connectors to the slots inside the UPS. The connectors are color-coded and assembled for proper alignment and installation.



8. Use the fixed plates to tighten the connectors securely.
9. Secure the cable housing to the rear panel of the UPS with four screws.

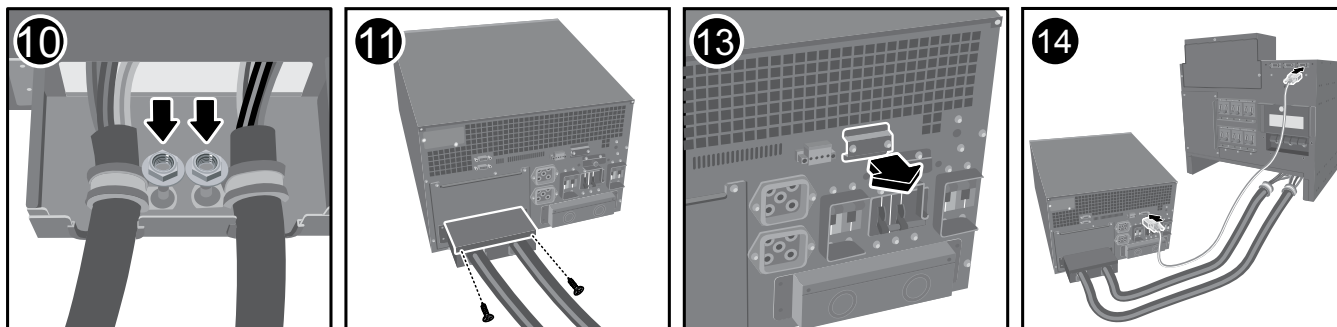


NOTE

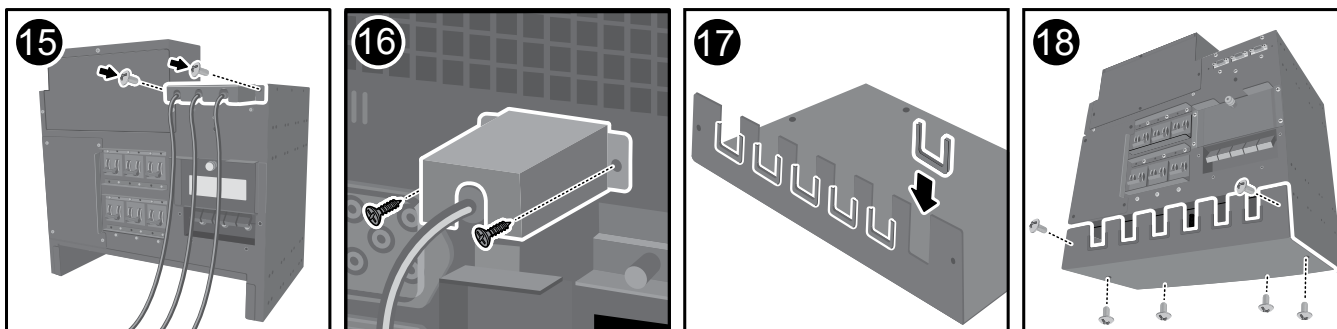
The parallel power cables assembly is the only connection to the UPS for input/output power when connected to the parallel POD. Do not make any connections to the input/output hardwired terminal block on the UPS' rear panel.

If the Liebert GXT2-10000RT-208 UPS was a stand-alone unit but now will be part of a parallel system, remove the input and output cables from the rear terminal block and cover the terminal block with the original conduit box.

10. Secure the cables to the housing with two cable clamps, 10mm hex driver required.
11. Put the cover plate on the housing and secure it with two screws.
12. Repeat **Steps 2** through **11** to connect the other parallel power cables to the other UPSs.
13. Remove the parallel port cover from the rear panel of the UPS using a 5mm hex driver.
14. Attach one end of the parallel communication cable to the parallel communication port on the parallel POD then another end to the parallel port on the UPS' rear panel. The parallel communication cable and power cable should correspond with the numbered port on the parallel POD. For example, if the power cable is connected to the input/output slot labeled "UPS1" on the parallel POD, then the parallel port cable must be connected to PORT 1 on the parallel POD.



15. Connect the parallel communication cable between UPS parallel port to the corresponding numbered port on the parallel POD.
16. Install the cover plates for the parallel communication cable connectors on the parallel POD and each UPS.
17. Insert the edge guards into the open slots on the parallel POD bottom cover.
18. Place the bottom cover plate on the parallel POD.



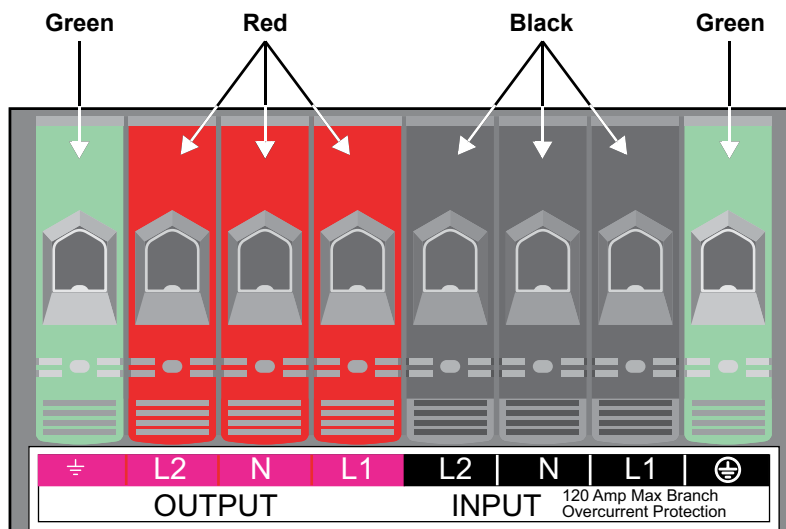
5.3 Main Input and Output Terminal Block Connections

Conduit entry holes are provided on the front top of the removable cover plate for the parallel POD. Input and output wiring should be run in separate conduit. See the following requirements and label to connect the wires.

Table 1 Electrical requirements

Input Current Rating	Recommended Maximum External Overcurrent Protection	Recommended Wire (including ground wire) (75°C copper wire)	Terminal Tightening Torque
83A	120A	1/0 AWG	50 lb-in (5.6 N-m)

Figure 11 Hardwire terminal connections

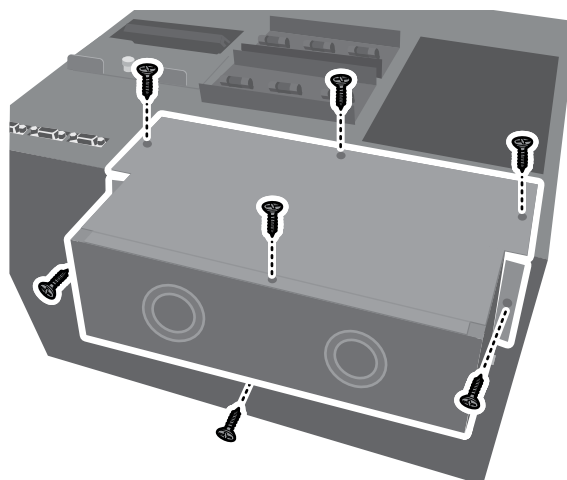


NOTE

Terminal blocks are color-coded for easy installation. Make sure that the wires are connected to the correct terminals. A 3/16" hex wrench is required for tightening the terminal blocks.

When the terminal block connections are done, secure the cover plate with seven screws.

Figure 12 Secure the cover plate over the terminal connections



5.4 Add an Output Power Distribution Module—Optional



WARNING

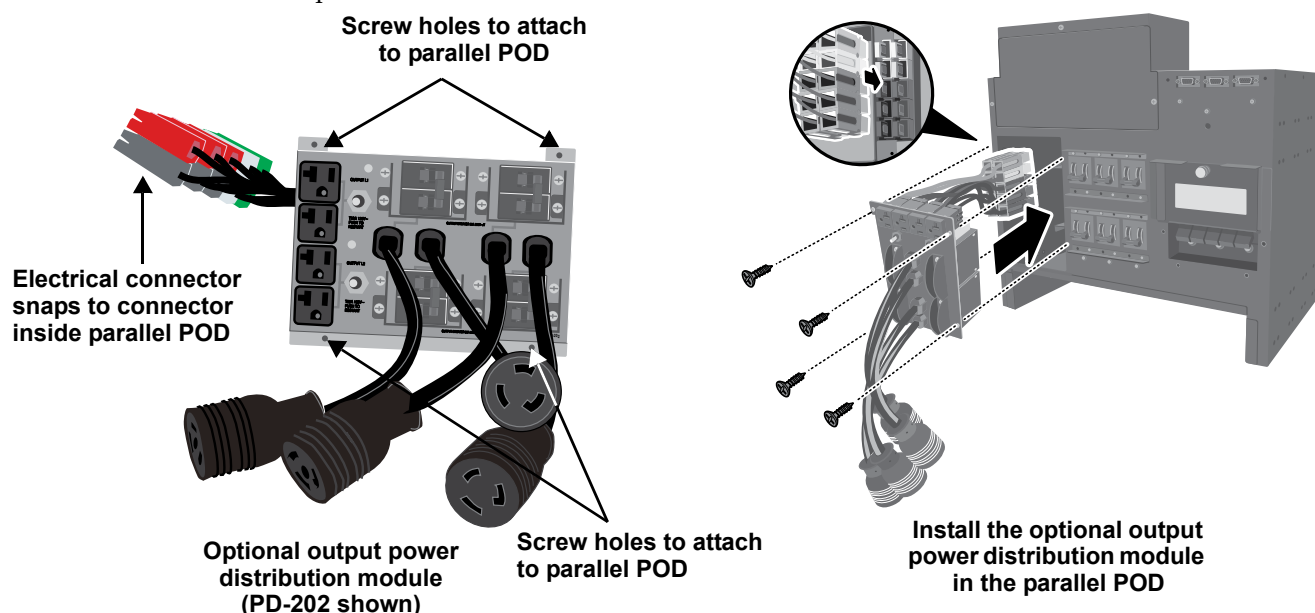
Risk of electric shock. Can cause equipment damage, injury or death.

Lethal voltages may exist within the UPS and parallel POD as long as the UPS is connected.

Before beginning to install the optional output distribution module, make sure the paralleling system and all connected UPSs are completely powered off.

To add an optional output distribution module to the Liebert GXT2-PP20KRT208:

1. Disconnect and secure utility power from the parallel POD and completely power Off all connected UPSs.
2. Remove the four screws securing the blank output distribution cover plate of the parallel POD.
3. Set the screws aside to attach an output distribution module to the parallel POD.
4. Snap together the color-coded, mating electrical connectors of the optional output distribution module to the parallel POD.
5. Use the screws removed in **Step 2** to attach the output distribution module to the distribution module to the parallel POD.



NOTE

The Liebert GXT2-PP20KRT208 distribution POD options are different than the distribution PODs used with individual Liebert GXT2-10000RT208 UPSs. Each POD type has different connectors and are not interchangeable.

If a Liebert GXT2-10000RT208 UPS that is to be connected to the parallel POD has a distribution POD option, then the distribution POD must be removed from the UPS to connect the parallel power cable assembly to the UPS.

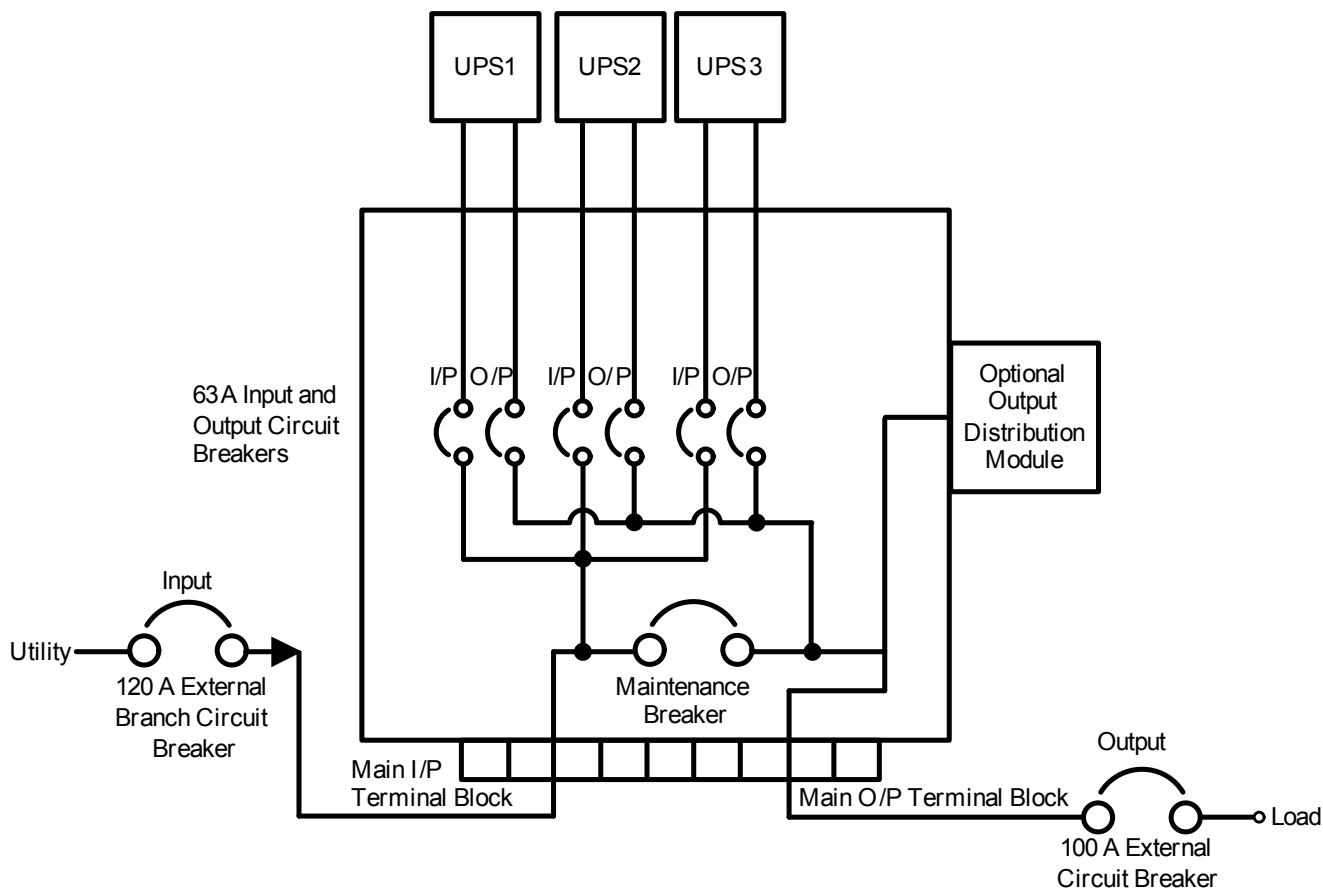
5.5 Parallel POD Main Electrical Connection—Must Be Installed

Electrical connections are made through a removable conduit box that attaches to the top of the parallel POD.

A branch breaker is required for short circuit or overcurrent protection. The installer must provide a 120A (@ 208V to 240V) branch circuit breaker. If the paralleling system detects any UPS with short circuit or overcurrent, the input circuit breaker and the output circuit breaker on the rear fixed-panel of the UPS will disconnect all power between the main cabinet and the distribution box.

The manual bypass breaker passes utility power directly to the bypass switch from the input terminal block. The three UPS input circuit breakers on the POD do not disconnect power from the manual bypass breaker.

Figure 13 120A branch circuit breaker connection



WARNING

Risk of electrical shock and fire. May cause equipment damage, personal injury and death. A disconnect switch for the AC input circuit must be field-supplied. To reduce the risk of fire, connect the disconnect switch only to a circuit provided with branch circuit overcurrent protection for 120A rating in accordance with the National Electric Code, ANSI/NFPA 70.



WARNING

Risk of electrical shock and fire. May cause equipment damage, personal injury and death. A disconnect switch for the AC output circuit must be field-supplied. To reduce the risk of fire, connect the disconnect switch only to a circuit provided with branch circuit overcurrent protection for 100A rating in accordance with the National Electric Code, ANSI/NFPA 70.

6.0 INITIAL STARTUP AND ELECTRICAL CHECKS

This section includes the procedures on how to install the paralleling system for the first time and how to perform initial system checks of each UPS individually before connecting them in parallel.

NOTICE

Miswiring power to the input terminal block (L1-L2-N-G) may damage the UPS.

For the initial installation, perform the following:

1. Verify that the input and output circuit breakers on UPS are Off (open). To find the circuit breakers, refer to the Liebert GXT2-10000RT208 user manual, SL-23444, available at the Liebert Web site, www.liebert.com
2. Verify that the parallel communication cables are disconnected from the parallel ports.
3. Verify that the UPS is completely Off.
4. Connect the UPS input power wires to the terminal block.
5. Connect the parallel POD utility main input. No load equipment should be connected at this time.

To start the initial electrical checks for each UPS:

1. Switch On (close) the UPS input and output breakers on the parallel POD of only the first UPS to be checked.
2. Measure the voltages of L1, L2, N, and G from the first UPS.
3. Switch On (close) the input and output circuit breakers, which are on the rear of the UPS.
4. Power on the UPS, and make sure it is operating normally.
Refer to the Liebert GXT2-10000RT208 user manual, SL-23444, for UPS operation.
5. Make sure the UPS output voltage is correct. If the output voltage of the UPS must be changed with the configuration program, it must be done now.
Refer to the Liebert GXT2-10000RT208 user manual, SL-23444, for help on using the configuration program.
6. Power Off the UPS, switch Off (open) the corresponding input and output breakers on the parallel POD and the Liebert GXT2-10000RT208 UPS.
7. Repeat the initial electrical checks on the second and third UPS to make sure each UPS in the paralleling system is operating normally and set for the same output voltage configuration.

7.0 CONFIGURATION

The Liebert GXT2-PP20KRT208 parallel POD allows connecting a maximum of three UPSs in parallel. See the following table for the maximum output power.

Table 2 Maximum output power from paralleled UPSs

Method	Number of UPSs	Maximum Output Power	Redundancy
Paralleling for Capacity	2	20kVA	—
Paralleling for Capacity and Redundancy	3	20kVA	10kVA

7.1 Paralleling for Capacity

When two UPSs are connected to the paralleling system, the maximum output power is 20kVA. Each UPS supplies 10kVA of output power. Redundant power is not available if either of the paralleled the UPSs fails.

7.2 Paralleling for Capacity and Redundancy

When three UPSs are connected to the paralleling system, the maximum output power is 20kVA, plus redundancy of one 10kVA UPS. This setup permits that the paralleling system to operate normally even if one of the UPSs fails or runs out of battery power.

For the paralleling procedures, see **5.0 - Installation**.

8.0 OPERATION

8.1 Operating Modes

8.1.1 Online Mode

NOTICE

Verify the operation of each UPS as detailed in **6.0 - Initial Startup and Electrical Checks** before powering On the parallel system as detailed below.

To power On the paralleling system:

1. Connect all parallel power cables and parallel communication cables between the UPSs and parallel POD.
2. Switch all output circuit breakers on the parallel POD to the On (closed) position.
3. Switch all input circuit breakers on the parallel POD to the On (closed) position.
4. Switch the input circuit breaker of all connected UPSs to the On (closed) position.
5. Switch the output circuit breaker of all connected UPSs to the On (closed) position.
6. Press the On button of the first UPS to switch on the inverter.
7. Within one minute, press the On button for the remaining parallel UPSs. Otherwise the paralleling system cannot enter Online mode.



NOTE

During the first minute a UPS is starting up, its “UPS On” indicator flashes.

8.1.2 Bypass Mode



WARNING

Risk of electric shock. Can cause equipment damage, injury or death.

Lethal voltages may exist within the UPS and parallel POD as long as the UPS is connected.

Do not open the maintenance bypass breaker cover unless the operating procedure instructs you to do so or conditions require it. If the mains fails, the connected load will lose input power.

NOTICE

Risk of loss of power. May cause equipment damage.

The UPSs must be switched to Bypass Mode before transferring the parallel POD to Bypass Mode. After the UPSs are in bypass, the parallel POD may be switched. If the UPSs are not switched first, power to the load may be lost.

While the maintenance bypass breaker is energized, the connected load is not protected from utility failures, surges and sags.

Opening the slide cover of the maintenance bypass breaker on the parallel POD transfers all connected UPSs to their internal bypass mode of operation.

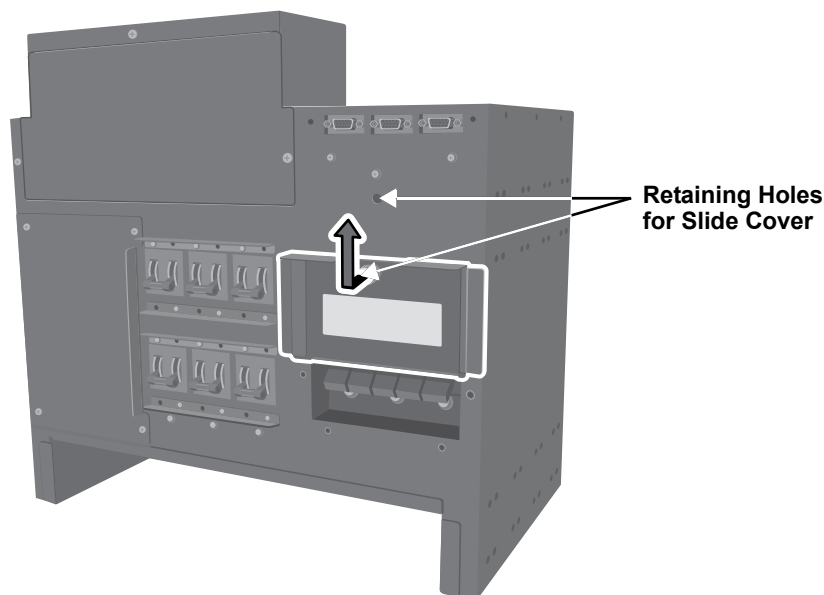
To move the cover:

1. Pull out on the thumb latch just far enough that it has cleared the retaining hole in the parallel POD frame (see **Figure 14**).
2. Slide the cover.
Retaining holes are provided to hold the slide cover in the Open and Closed positions.
3. Turn the maintenance bypass breaker to the On position.

The paralleling system will enter Bypass Mode and the load will be supported by utility power.

The slide cover must be fully closed with the maintenance bypass breaker Off for the connected UPSs to operate in their normal operation mode.

Figure 14 Open the maintenance bypass breaker cover



8.1.3 Output Off Mode

To transfer the paralleling system to Output Off Mode:

1. Make sure that each UPS is in Bypass Mode.
If a UPS is not in Bypass Mode, press the UPS' Off button once (see **8.1.2 - Bypass Mode**).
2. Press the Off button on the first UPS twice within four seconds.
3. Perform **Step 2** on each UPS in the paralleling system within one minute, otherwise the paralleling system cannot enter Output Off Mode.
4. Each UPS will transfer to Output Off Mode synchronously.



NOTE

If one of the UPSs in the paralleling system is not in Bypass Mode, press the Off button on the UPS that is not in Bypass Mode twice to immediately shut down only that UPS.

8.2 Fault Condition

If one UPS in the paralleling system fails due to either of the following two conditions, the other UPSs in the paralleling system will remain in Bypass Mode.

- UPS has a soft-start fault (LED E on the UPS control panel illuminates).
- The internal battery in the UPS is disconnected or the battery voltage is less than 200V (LED A and LED C on the UPS control panel illuminate).

Once the fault is cleared, see **8.5 - Add a Single UPS to the Online Paralleling System** to reinstall the UPS in the paralleling system.

8.3 Battery Test

To initiate a manual battery test, execute the “Manual Battery Test” command from the UPS control panel or RS-232 port. For the battery test to proceed, the UPS battery capacity must be 90 percent or greater. If capacity is less than 90 percent, the battery test will be aborted.

If battery failure is detected during the test, the test will be aborted, the UPS will return to Line Mode and LEDs A and C on the front panel will illuminate.

To stop the battery test manually, press the Off button for at least one second or execute the “Cancel Battery Test” command via the RS-232 port. The test stops and the UPS returns to Line Mode.

8.4 Parallel Communication Cable Disconnection

There is only one master UPS in a paralleling system; the other UPSs operate as slaves. If one parallel communication cable disconnects from the paralleling system, the UPS will detect this fault and transfer to Output Off Mode with alarm. The UPS must be shut down to clear this fault.

8.5 Add a Single UPS to the Online Paralleling System

1. Make sure that breakers on the UPS to be added and the corresponding breakers on the parallel POD are in the Off position.
2. Connect the parallel power cables between the UPS and the parallel POD.
3. Turn On the corresponding input breaker (do NOT turn On the corresponding output breaker) on the parallel POD and make sure the input phase of the UPS is correct.
4. Turn On the input and output breakers on the UPS.
5. Turn on the UPS by pressing the On button.
6. Make sure that the single UPS is working normally and its output voltage is the same as the paralleling system. If the output voltage of the UPS needs to be changed with the configuration program, it must be done now.
7. Shut off the UPS by pressing the Off button and open the input breaker.
8. Make sure that the single UPS has shut down.
9. Connect the parallel communication cable between the UPS and parallel POD.
10. Close the input and output breakers on the UPS and the corresponding breakers on the parallel POD. The UPS is now in Output Off Mode.
11. Press the On button on the UPS. The UPS will join the paralleling system.

8.6 Remove a Single UPS from the Paralleling System

1. Press the UPS' Off button twice within four seconds to turn it off. The UPS will transfer to Output Off Mode.
2. Open the input and output breakers on the UPS and the corresponding input and output breakers on the parallel POD.
3. Verify that the single UPS has shut down.
4. Disconnect the parallel communication cable and the parallel power cable between the UPS and parallel POD.



NOTE

*To shut down an individual UPS in the paralleling system while others are in Line Mode, press the Off button on the UPS control panel **twice** within four seconds.*

8.7 Replacing a Faulty Power Module or UPS Internal Battery

1. Press the UPS' Off button twice within four seconds to turn off the UPS. The UPS will transfer to Output Off Mode.
2. Turn Off the input and output breakers on the UPS and the corresponding input and output breakers on the parallel POD.
3. Make sure that the single UPS has shut down.
4. Disconnect the parallel communication cable between the UPS and parallel POD.
5. Remove the front bezel cover, battery cover, and battery bracket from the UPS and disconnect the battery connectors. (Refer to the detailed steps in the Liebert GXT2-10000RT208 user manual, SL-23444, available at the Liebert Web site, www.liebert.com)
6. Replace the faulty power module or internal UPS battery.
7. Close the corresponding input breaker on the parallel POD and make sure that the UPS' input phase is correct.
8. Close the UPS' input and output breakers.
9. Press the UPS' On button to turn on the UPS.
10. Make sure that the single UPS is operating normally and that its output voltage is the same as the output voltage of the paralleling system.



NOTE

If the UPS' output voltage needs to be changed with the configuration program, it must be done immediately.

11. Press the Off button of the single UPS twice within four seconds to turn it off.
12. Open the input and output breakers on the single UPS and the corresponding breakers on the parallel POD.
13. Connect the parallel communication cable between the UPS and parallel POD.
14. Close the input and output breakers on the UPS and the corresponding breakers on the parallel POD. The UPS is now in Output Off Mode.
15. Press the UPS' On button. The UPS will join the paralleling system.

8.8 Overload Condition

If an overload is detected in the paralleling system, each UPS works as a single UPS. When exceeding the overload time, each UPS will transfer its mode. The mode transitions and the corresponding conditions are listed below.

1. If the bypass is abnormal, the UPS will transfer to No Output Mode (for Battery mode) or overload fault (for Line mode). Users must use the reset button to release the fault.
2. If the bypass is working normally, the UPS will transfer to No Output Mode without overload fault.
3. If the UPS is the last one in the paralleling system and the bypass is working normally, each UPS will transfer to Bypass Mode. After the entire paralleling system has recovered from the overload, the system will restart automatically and return to Line Mode.
4. If the bypass is abnormal, the UPS will transfer to No Output Mode without overload fault for Battery mode, and the UPS will transfer to overload fault for Line mode. When the utility power returns, the paralleling system that its original mode is Battery mode will restart automatically and return to Line Mode.

8.9 Battery Low Voltage—Battery Mode

See the following conditions when the battery low voltage is detected in the paralleling system.

- If one UPS battery is running low, it will transfer to Output Off Mode. The other UPSs continue to supply power to the load.
- If all UPS batteries are running low, the devices will transfer to Output Off Mode and shut down simultaneously. When utility power returns, the paralleling system will restart automatically.
- If one UPS battery is running low and the rest are overloaded in Battery Mode, each UPS in the system shuts down simultaneously without the overload fault. When utility power returns, the paralleling system will restart automatically and return to Line Mode.
- If the last UPS encounters the overload condition, it will transfer to Bypass Mode or shutdown depending on the bypass condition.
 - When the bypass is good, each UPS in the paralleling system will transfer to Bypass Mode.
 - When the bypass is abnormal, every UPS in the paralleling system will shut down.

9.0 COMMUNICATION

9.1 Communication Interface

The Liebert GXT2-PP20KRT208 parallel POD has three communication connectors for communication between the UPSs. These connectors must not be used for any other monitoring applications.

Each connected Liebert GXT2-10000RT208 UPS can be monitored as described in **2.4 - Liebert MultiLink™ Shutdown**. The recommended monitoring configuration is with the Liebert IntelliSlot SNMP card option. Refer to the Liebert GXT2-10000RT208 user manual, SL-23444, for additional information on UPS communication.

When more than one Liebert GXT2-10000RT208 UPS is connected in a parallel operation with the parallel POD, each connected UPS will generate On Battery and Low Battery signals according to the load and the capacity of the UPS. The serial communication is programmed to not send these commands when the total system is operating in a redundant status. This will provide the maximum amount of up-time to the connected equipment.



NOTE

Use of the UPS DB-9 interface port or relay card option will not evaluate the redundancy status of the parallel system before generating the On Battery and Low Battery signals. These are generated with hardware logic circuits and cannot be disabled.

9.2 UPS Status Information

Liebert MultiLink permits monitoring the status of each UPS connected to the parallel POD. However, the status is reported separately to Liebert MultiLink—The parallel POD does not report system level information of the parallel configuration.

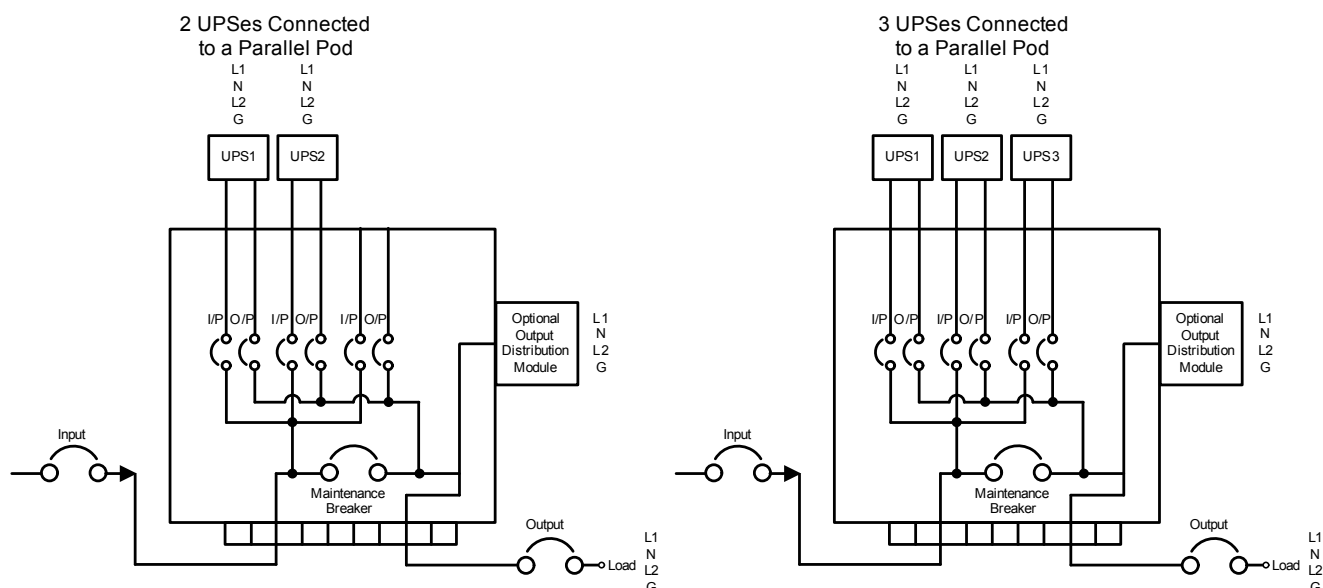
When all UPSs in a parallel configuration are monitored as described in **2.4 - Liebert MultiLink™ Shutdown**, each UPS will report its own status to Liebert MultiLink. To determine the total load the parallel POD is supporting, the individual UPS load levels must be added together.

When only one UPS is monitored by Liebert MultiLink, its load status will be the same as the status of the other connected UPSs because each UPS supports an equal share of the load. If two UPSs are connected, then the load level communicated by a single UPS must be doubled to determine the load being supported by the parallel POD. If three UPSs are connected, then the load level communicated by a single UPS must be tripled to determine the load being supported by the parallel POD.

Battery statistics reported will be the condition of the batteries in a single UPS, not the condition of all batteries in the parallel system. The battery run-time available is determined by the battery charge and the load that the UPS is supporting.

When a UPS operating in a parallel redundant capacity shuts off due to its end of battery discharge, its portion of the load will be shifted to the remaining UPSs. This is a step load increase onto the remaining UPSs. The load increase will reduce the battery run-time available from the remaining UPS or UPSs. This must be taken into account when making the monitoring settings, such as the low-battery warning time, in Liebert MultiLink.

Each Liebert GXT2-10000RT208 UPS reports its own operating conditions. When monitoring UPSs connected in parallel with the parallel POD, the information reported by each UPS will equal its portion of the total load. **Figure 15** shows how the total load is calculated from the load information of each UPS.

Figure 15 Calculating total load per UPS**Table 3 Calculating total load, 20kVA example**

20kVA Load, Full Load of Parallel Pod											
2 UPSs Connected to Parallel POD					3 UPSs Connected to Parallel POD						
UPS 1		UPS 2		Total Output Load	UPS 1		UPS 2		UPS 3		Total Output Load
L1-N	L2-N	L1-N	L2-N		L1-N	L2-N	L1-N	L2-N	L1-N	L2-N	
5	5	5	5	20	3.3	3.3	3.3	3.3	3.3	3.3	20

Total load supported by the parallel POD for each of these configurations is 20kVA. If two UPSs are connected to the parallel POD, each provides 10kVA. If three UPSs are connected to the parallel POD, each provides 6.67kVA. This example is the full load capacity of the parallel POD.

Table 4 Calculating total load, 12kVA example

12kVA Load, Full Load of Parallel Pod											
2 UPSs Connected to Parallel POD					3 UPSs Connected to Parallel POD						
UPS 1		UPS 2		Total Output Load	UPS 1		UPS 2		UPS 3		Total Output Load
L1-N	L2-N	L1-N	L2-N		L1-N	L2-N	L1-N	L2-N	L1-N	L2-N	
3	3	3	3	12	2	2	2	2	2	2	12

Total load supported by the parallel POD for each of these configurations is 12kVA. If two UPSs are connected to the parallel POD, each provides 6kVA. If three UPSs are connected to the parallel POD, each provides 4kVA. This example is with all 120V loads evenly distributed between L1-N and L2-N, or with 208/240V loads.

UPS 1		UPS 2		Total Output Load	UPS 1		UPS 2		UPS 3		Total Output Load
L1-N	L2-N	L1-N	L2-N		L1-N	L2-N	L1-N	L2-N	L1-N	L2-N	
2	4	2	4	12	1.33	2.67	1.33	2.67	1.33	2.67	12

Total load supported by the parallel POD for each of these configurations is 12kVA. If two UPSs are connected to the parallel POD, each provides 6kVA. If three UPSs are connected to the parallel POD, each provides 4kVA. This example is with more 120V loads connected on L2-N output.

Note that the L1-N, L2-N and L1-L2 loads are evenly shared among all the connected UPSs. Load values are in kVA.

9.3 UPS Configuration Settings

Refer to the Liebert GXT2-10000RT208 user manual, SL-23444, for additional information on using the UPS Configuration Program.

When the configuration program is used with any of the connected Liebert GXT2-10000RT208 UPSs, options selected are changed in all operational UPSs connected to the parallel POD with the parallel communication cable.

If only one UPS is operational, or if any parallel communication cables are removed from the parallel POD, then options selected with the configuration program will be made only it that operational UPS.

NOTICE

Risk of improper configuration. May cause equipment damage.

All UPSs operating in a parallel mode must have their output voltages configured for the same value. Operating in parallel mode with UPSs configured for different output voltages may damage the UPSs.

When optional settings are selected, such as the Auto-restart delay, the same configuration choice must be made on all connected UPSs. This permits all UPSs connected to the parallel POD to operate in the same manner.

10.0 SPECIFICATIONS

Table 5 Parallel POD specifications

Model Number	Liebert GXT2-PP20KRT208
Model Rating	20,000VA / 16,000W at 120/208 or 120/240 VAC
Dimensions, in (mm)	
Unit, W x D x H in. (mm)	16.94 x 9.85 x 16.61 (430 x 250 x 422)
Shipping, W x D x H in. (mm)	23.05 x 16.74 x 19.38 (585 x 425 x 492)
Weight, lb (kg)	
Unit	41.89 (19)
Shipping	48.94 (22.2)
Input AC Parameters	
Nominal Operating Frequency	50 or 60 Hz
Nominal Operating Voltage	120/208 or 120/240 VAC
Input Power Connection	Hardwire Terminal Block 3W + G (L-L-N-G)
Output AC Parameters	
Voltage	120/208 or 120/240 VAC
Output Connections	Hardwire Terminal Block 3W + G (L-L-N-G); also see 3.6 - Optional Power Distribution
Frequency	50 Hz or 60 Hz, Nominal
Agency	
Safety	UL / c-UL Listed as accessory for UPS
ESD	EN61000-4-2, Level 4, Criteria A
Radiated Susceptibility	EN61000-4-3, Level 3, Criteria A
Conducted Immunity	EN61000-4-6 Level 3, Criteria A
EFT / Burst	EN61000-4-4, Level 4, Criteria A
Surge	EN61000-4-5, Level 3, Criteria A ANSI C62.41 (IEEE 587) Category A (Level 3) & B (Level 1)
Transportation	ISTA 1A

Table 6 Paralleling cable kit dimensions and weight

Model Number	Liebert GXT2-20KPC-6 (1 required for each UPS)
Dimensions, in (mm)	
Shipping, W x D x H in. (mm)	15.76 x 15.76 x 4.02 (400 x 400 x 120)
Weight, lb (kg)	
Shipping	13.89 (6.3)

Table 7 Optional output distribution specifications—PD-201

Model Number	PD-201
Dimensions, in (mm)	
Shipping W x D x H in. (mm)	10.44 x 8.87 x 7.88 (265 x 225 x 200)
Weight, lb (kg)	
Unit	5.29 (2.4)
Shipping	6.39 (2.9)
Electrical Specifications	
Amp Rating	120A (multiple connectors used)
Input Power Connections	Internal Anderson connectors
Output Power Connection	
L1-L2-G	(4) L6-20R on a 12" cord
L1-N-G	(2) 5-15/20R, T-type receptacles with (1) 20A circuit breaker
L2-N-G	(2) 5-15/20R, T-type receptacles with (1) 20A circuit breaker

Table 8 Optional output distribution specifications—PD-202

Model Number	PD-202
Dimensions, in (mm)	
Shipping, W x D x H in. (mm)	10.44 x 8.87 x 7.88 (265 x 225 x 200)
Weight, lb (kg)	
Unit	5.95 (2.7)
Shipping	7.05 (3.2)
Electrical Specifications	
Amp Rating	120 Amps (multiple connectors used)
Input Power Connections	Internal Anderson connectors
Output Power Connection	
L1-L2-G	(4) L6-30R on a 12" cord
L1-N-G	(2) 5-15/20R, T-type, receptacles with (1) 20A circuit breaker
L2-N-G	(2) 5-15/20R, T-type, receptacles with (1) 20A circuit breaker

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SL-23451_REV02_08-08

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